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ACRONYMS AND ABBREVIATIONS

AAQS	ambient air quality standards
ADT	Average Daily Traffic
APCD	Air Pollution Control Division
asl	above sea level
BACT	Best Achievable Control Technology
BED	Burlington Electric Department
CAA	Clean Air Act
CEDO	Community and Economic Development Office
CEM	continuous emission monitoring
CEQ	Council on Environmental Quality
CO	Carbon monoxide
CT	combustion turbine
dB	decibels
DOE	Department of Energy
E.O.	Executive Order
EA	environmental assessment
EPA	Environmental Protection Agency
FERCO	Future Energy Resources Corporation
L_{dn}	Day-Night Average Level
LOS	Level of Service
MACT	Maximum Achievable Control Technology
McNeil Station	Joseph C. McNeil Generating Station
MW	megawatts
NEPA	National Environmental Policy Act
NEPP	New England Power Pool
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitric oxide
NPDES	National Pollutant Discharge Elimination System
psig	pounds per square inch gauge
RCO	Recreation/Conservation/Open Space
SO_2	Sulfur dioxide
ST	steam-turbine
USFS	U.S. Forest Service

VDEC	Vermont Department of Environmental Conservation
VDFPR	Vermont Department of Forests, Parks, and Recreation
VDFW	Vermont Department of Fish and Wildlife
VOC	volatile organic compounds
wet	green

SUMMARY

The U.S. Department of Energy (DOE) is proposing to partially fund a biomass gasification demonstration project at the existing Joseph C. McNeil Generating Station in Burlington, Vermont. The McNeil Station currently uses wood fuel to provide the energy for electricity production. The project would demonstrate the technical feasibility and efficiency of converting biomass (wood chips) into gas for electricity production. Data obtained from the project could be applied to the design of future biomass conversion facilities on a commercial scale.

This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality Regulations, and the DOE NEPA Regulations. It discusses the proposed action, presents reasonable alternatives to the project, and evaluates the potential impacts of constructing and operating a biomass gasifier. DOE will use this EA as a basis for its decision to provide financial assistance to the project applicant, Future Energy Resources Corporation.

The proposed action would be conducted in three phases. Phase I would consist of designing, engineering, and permitting the gasifier. Phase II would consist of constructing and operating the biomass gasifier. Product gas generated would be sent to the existing boilers for steam generation and subsequent production of electricity. The gasification unit would be adjacent to the existing Station and would be enclosed in a structure measuring approximately 40 feet by 50 feet.

In Phase III, a gas combustion turbine would be installed to accept the product gas from the gasifier and produce an estimated 15 megawatts of additional electricity. Other equipment associated with Phase III includes an electric generator and a weather enclosure.

Alternatives to the proposed action include no action, locating the project at a new location, and locating the project at an existing wood burning facility other than the McNeil Station. After consideration these alternatives were dismissed from further consideration. Under the no action alternative, the opportunity to demonstrate an efficient electrical generating process would be lost. Siting the project at a new location would likely result in impacts not associated with the proposed action because of excessive land

disturbance. Locating the project at an existing site offers no distinct advantages because the proposed project would not pose any adverse impacts.

The McNeil Station provides an ideal location for this demonstration project for many reasons, including: the existing wood supply and infrastructure already provides a stable wood fuel to the gasification process; the station operates on an intermittent basis, thereby affording the opportunity to demonstrate the project without interruption of service and the familiarity of the station operators with wood handling background for operation of a wood gasifier.

Environmental Analysis Summary

This EA for the proposed biomass gasifier considered potential environmental impacts to the following categories:

- Socioeconomics
- Air Quality
- Water Resources and Water Quality
- Natural Resources
- Noise
- Transportation

No adverse environmental impacts to the above categories would result from the proposed project.

CHAPTER 1
INTRODUCTION

1.1 INTENDED USE OF THIS ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) is an informational document which is intended to summarize information used by the Department of Energy (DOE) and other public agency decision makers with the environmental documentation required to take informed discretionary action on the proposed Biomass Gasification Demonstration project. This EA assesses, the potential environmental impacts and cumulative impacts, possible ways to minimize effects associated with the proposed project, and discusses reasonable alternatives to the project. The DOE will use the information gathered and contained in this EA as a basis for their decision to provide financial assistance to Future Energy Resources Corporation (FERCO), the project applicant. The anticipated cost of the proposed project wold be shared evenly between DOE and FERCO.

1.2 ENVIRONMENTAL PROCEDURES

This EA has been prepared in conformance with the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508) and also complies with the rules, regulations, and procedures for the implementation of National Environmental Policy Act (NEPA, Public Law 91-190, 42 U.S.C. 4321-4347, as amended, 40 CFR 1500-150 8222) as adopted by DOE at 10 CFR Part 1021, entitled "Compliance with the NEPA - Final Rule." This EA reflects the independent judgement of the DOE.

1.3 PROJECT BACKGROUND

The Joseph C. McNeil Generating Station (McNeil Station) is an existing power plant that utilizes wood as its primary fuel for the production of electricity. The McNeil Station began construction in April 1981. Prior to construction of the McNeil Station, a Certificate of Public Good was required. The certificate, approved by the Vermont Public Service, mandates that the station operate in such a manner that will "... protect the health, safety and welfare of the general public and maintain the quality of the natural environment." In June 1984, the McNeil Station started commercial power generation.

The McNeil Station is jointly-owned by Burlington Electric Department (BED) , Green Mountain Power Corporation, Central Vermont Public Service Corporation, and Vermont Public Power Supply Authority (collectively referred to as the McNeil Joint Owners).

In December 1988, BED filed a petition requesting that their Certificate of Public Good issued for the McNeil Station be amended to

allow BED to install the necessary equipment which would enable the McNeil Station to burn natural gas. In October 1989, the capability to burn with natural gas was added to the station making it the largest project undertaken at the station since the original construction.

In March 1994, the joint owners of the McNeil Station entered into an agreement with FERCO for the development and commercial demonstration of biomass integrated gasifier/gas turbine technology. The McNeil Joint Owners would make an "in-kind contribution" to the project by making available to FERCO the McNeil Station's existing infrastructure, wood handling capacity, feedstock permits and contracts, waste and water treatment facility, emission monitoring and reporting, and general operating experience. There will be no unreimbursed cash expenditures by the McNeil Joint Owners on the proposed project.

1.4 PURPOSE AND NEED FOR ACTION

The proposed project includes three phases. Phase I of the proposed project is design, engineering, and permitting of the biomas gasifier. The purpose of Phase II is basic construction and demonstration of the technical feasibility and efficiency of converting biomass (wood chips) into gas for electricity production. If Phase II is found to be successful, Phase III of the proposed project would demonstrate the use of the biogas to produce electricity at an efficient, cost-competitive, commercial-scale basis through the operation of a turbine generator.

As a demonstration project, the proposed gasification facility would generate useful and needed information on the feasibility, cost, and scientific and engineering requirements of the biomass gasification technology. Data obtained from this project could be applied to the design of future biomass conversion facilities on a commercial scale.

CHAPTER 2
PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The proposed project would be located at BED's existing McNeil Station. As shown in Figure 2-1, the proposed project site is located at the northern end of the City of Burlington, Chittenden County, Vermont. Figure 2-2 is a map showing the location of the generating station (the location of the proposed project) and its location within the City of Burlington.

The generating station is located at 111 Intervale Road, within the City of Burlington's Intervale District within a Recreation/ Conservation/Open Space (RCO) Zone. The McNeil Station is bound on the north by open space; on the east by light industry; on the south by the Central Vermont Railroad and residences [approximately 460 meters (1,500 feet) from the McNeil Station operating equipment); and on the west by open space (Figure 2-2).

2.2 EXISTING OPERATIONS AT THE McNEIL STATION

The station is a wood- and natural gas-fired, binary cycle, steam power plant operated by BED. The station can currently generate a net of 50-megawatts (MW) of electrical energy production during full-load. The station currently operates approximately 25 percent of the year, responding only to the electrical demands of the New England Power Pool (NEPP). Approximately 75 percent of the time the McNeil Station is in an idle mode ready to supply power to the NEPP grid for scheduled and unplanned maintenance of other power plants in the NEPP.

2.2.1 McNEIL STATION COMPONENTS

The components of the existing McNeil Station are typical of conventional steam power plants, consisting generally of a fuel boiler, steam-turbine (ST) generator, cooling system, waste water facilities, electrical interconnection and associated auxiliary equipment. The existing power plant includes the major components described below. These are the components that would be effected by the proposed project. Figure 2-3 shows a plot plan of the station.

Fuel Boiler: The boiler is designed with both a travelling grate with pneumatic feeders for introducing wood fuel to the firebox, and burners for the combustion of natural gas. Either of these fuels can be fired separately or simultaneously during operation. The boiler is rated at 217,000 kilograms (480,000 pounds) of steam per hour. Within the walls of the boiler are a series of pipes.

Figure 2-1 Regional Map

Figure 2-2 Vicinity Map

Figure 2-3 Plot Plan

When makeup water is passed through these pipes, the water is heated by the fuel combusted in the fuel box. Once heated, steam is generated for use in the turbine. Steam conditions are rated at 510E Celcius (950E Fahrenheit) and 1,275 pounds per square inch gauge (psig).

Steam-Turbine Generator: The ST is a standard condensing unit into which high pressure steam from the fuel boiler is piped. The steam passes through an array of blades, which create the rotation for power generation. The steam turbine shaft is connected directly to an electric generator rated at 3,600 rotations per minute.

Cooling System: Steam from the ST is cooled, condensed, and reused through the application of a standard industrial cooling system. After exiting the ST, steam is then exhausted into a "two-pass" condenser. Circulating water passes through the condenser tubing and changes the exhaust steam into condensate which is returned to the boiler.

The circulating water is piped to a cooling tower where direct contact with ambient air reduces the temperature of the water as it is returned through the condenser a second time at a temperature cooler than when it first entered the cooling tower. Some water escapes as vapor from the top of the tower during this process. The water lost through evaporation is replaced by make-up water from four wells north of the station. The rated capacity of each well is 550 gallons per minute. The circulating water cooled in its passage through the cooling tower is collected in large capacity storage basin. This basin is the suction point for the two circulating water pumps that move water through the condenser.

Wastewater Facilities: Approximately 280 to 340 liters (75-90 gallons) per minute of water is "blown-down" from the storage basin, i.e., removed from the lowest point of the basin and sent to water treatment lagoons. This process controls the quantity of solids that build up in the cooling tower basin. Water used in the backwash of filters and used for regenerating plant demineralized units is sent to two cooling lagoons where its temperature is stabilized, and chemicals are added (if required) to bring the pH of the water to a neutral point. Water from these lagoons is discharged to the nearby Winooski River. Monitoring at the discharge point demonstrates compliance with Vermont Water Resources standards as established in the plant's discharge permit.

Air Emission Reduction Systems: Air emissions associated with the existing operations are currently discharged via an on-site smokestack. A Continuous Emission Monitoring (CEM) system is utilized to document continual compliance with all air emission criteria levels.

Electrical Interconnection: The electricity generated by the McNeil Station is sold to the NEPP. The interconnection facilities include a switchyard inside the fenceline of the generating station, and an electric transmission line running from the switchyard to a point of interconnection with NEPP.

2.2.2 McNEIL STATION FUEL REQUIREMENTS

The amount of wood used during operations depends upon the operating conditions of the station. To run the station at full-load, the consumption of whole tree chips is approximately 76 tons per hour. Approximately 80 percent of the woodchips that fuel the station are derived from low-quality trees and harvest residues. The remaining 20 percent of the stations wood fuel requirements are met by purchasing residues such as wood chips and bark from local sawmills.

The station can also be fired with natural gas on an interruptible basis between May 1 and November 1 of each year (non-winter months) when excess capacity and supply is available. Vermont Gas currently supplies the station natural gas via an underground pipeline. While wood remains the station's primary fuel, the addition of natural gas allows the station to operate more frequently, making it more economical (the station's efficiency at full-load on natural gas is approximately 15 percent higher than when firing wood). The station consumes approximately 16,000 cubic meters (550,000 cubic feet) of natural gas per hour when operating at full-load.

2.3 PROJECT DESCRIPTION

The proposed project would consist of three phases. Phase I of the proposed project is design engineering and permitting of the biomass gasifier. Phase II is intended to demonstrate the viability and efficiency of a biomass gasifier for the production of gas for use in the existing McNeil Station boilers. In Phase III, a gas combustion turbine would be installed to accept the product gas from the gasifier and form an integral part of a combined cycle system. However, Phase III is contingent upon the successful operation of Phase II and the need for increased electrical dispatch of the McNeil Station. Since Phase I would not have any operation-related activities, this phase is not described in detail. Descriptions for Phases II and III follow.

2.3.1 OPERATION OF PHASE II

Phase II of the proposed project provides for the installation and operation of the biomass gasifier. As shown in Figure 2-3, the area proposed for erection and operation of the gasification unit is adjacent to the existing fuel boiler building within the McNeil Station boundaries (refer to Section 2.2.1-McNeil Station Components). The

gasification unit would consist of a single, steel framed enclosed structure approximately 12 meters (40 feet) by 15 meters (50 feet). The Phase II gasification process is briefly explained below along with descriptions of the proposed gasification features/components. The associated process flow diagram is shown in Figure 2-4.

The gasification unit being proposed will utilize a process developed by the Battelle Laboratories of Columbus, Ohio. The proposed gasifier would be designed to process up to 200 dry tons per day of woodchips. Woodchips would be transferred to the gasifier from an on-site fuel hopper (located adjacent to BED's existing wood storage area) via an inclined conveyor belt (See Figure 2-3).

After the biomass enters the gasification unit, it would be conveyed through a dryer and sent to a storage hopper. Dried biomass material would be transferred to one of two physically separate, vertical cylindrical reactors. The gasification reactor (gasifier) is where the biomass is broken-down and converted into a medium british thermal units (Btu) gas and residual char (charcoal). This process requires steam and hot sand which act as agents to convert the biomass into product gas. Following biomass conversion in the gasification reactor, product gas, sand, and char are transferred to a cyclone separator. During operation of Phase II, the cyclone would divert the product gas to the station's existing boiler while the sand and residual char are sent to the bottom of the combustion reactor (combuster). Within the combustion reactor, an air stream is introduced which burns the residual char producing a second source of gas (flue gas) and provides the fuel to reheat the sand which is used for subsequent gasification. Once the conversion is made in the combuster reactor, the flue gas and sand are transferred to a second cyclone where the flue gas is recovered and used as waste heat in the feed dryer while the sand returns to the gasification reactor. Heat transfer between reactors is accomplished by a stream of circulating sand which passes between the combuster and gasifier.

The proposed gasification unit would be designed to produce a product gas of at least 400 to 500 Btu/standard cubic feet (half the heating value of natural gas). The product gas would consist of a mixture of carbon monoxide, hydrogen, methane, and carbon dioxide and is particularly well suited as a substitute for natural gas. The product

Figure 2-4. Battelle's Biomass Gasification System

gas produced during operation of Phase II would be used in the existing boilers thereby displacing the equivalent heating value of wood or natural gas. During Phase II of the proposed project, no increase in the power output of the McNeil Station would be realized.

During operation of the gasification unit, waste material from the spent char and particles of ash would be separated from the flue gas and collected in an ash recovery cyclone before being disposed of offsite. The exhaust gas from the gasification unit would be directed to the existing McNeil Station and exit to the atmosphere through the existing on-site stack. The CEM would be utilized to track emission levels during Phase II operations. A separate metal stack, approximately 6 meters (20 feet) high and .5 meters (20 inches) in diameter, would be erected as a flare stack for emergency conditions. Under normal conditions, the product gas would be burned in the on-site boiler. In the event the boiler trips off-line while burning the product gas, the gasifier would stop operations diverting the "trapped" gas to the proposed emergency flare stack to be burned off.

Approximately 14-months have been scheduled for project permitting and for construction of the gasification unit with a schedule of approximately 8 to 10 months for the demonstration program.

2.3.2 OPERATION OF PHASE III

Phase III of the proposed project provides for the installation and operation of a gas combustion turbine (CT) generator which would be fueled by the product gas generated in the Phase II gasifier described in Section 2.3.1. The CT could generate up to an additional 15 MW of electrical capacity and related energy. In addition to the CT, Phase III could include other associated support components described below. It should be noted that approval for Phase III is not being requested at this time. Detailed design has not been performed for Phase III of the proposed project and only limited project planning has been done by FERCO. The following general operation information was obtained from the project proponents so that potential environmental effects could be identified.

The specific type of CT proposed for the project is not known at this stage of the planning process. However, the kind of turbines typically used in this process are state-of-the-art, designed to achieve high efficiencies and low environmental emissions. CTs have been in use by utilities as peaking plants, operating a few hours a day during peak load conditions, for the past two to three decades. With the advent of more efficient turbines, and their installation into combined cycle configurations, their use as intermediate and baseload plants, designed to economically operate around the clock, has become feasible.

The CT portion of the facility would consist of the turbine; an electric generator; controls; a sound-attenuating, weather enclosure; and a concrete foundation. Air intake structures and exhaust systems would also be designed to reduce operational noise to acceptable levels as prescribed by federal, state and local ordinances. The electrical output from the CT could be as much as 15 MW, however, it could be operated at lower output rating.

The fuel for the CT would be the same product gas used during Phase II operations, supplied from the gasifier. While the actual design and point of interconnections have not been established, the new gas/CT facilities could be easily installed within the boundaries of the McNeil Station, connecting to existing infrastructure adjacent to or near the site.

2.4 PROJECT ALTERNATIVES

2.4.1 NO ACTION

With the No Action Alternative, operations would continue similar to existing conditions, meeting electrical dispatch demands of the NEPP. Under the No Action Alternative, the objective and opportunity to demonstrate a superior gasification technology with higher conversion efficiencies using woodchips (biomass) would not be explored and the commercial viability of the proposed project's biomass gasification process would not be demonstrated. As such, the expected efficiencies and cost savings of the proposed project would not be realized.

2.4.2 OTHER ALTERNATIVES CONSIDERED

The alternative of locating the proposed project independently to a new location other than the McNeil Station site was considered. The siting of an independent biomass gasifier at a new location to satisfy the objectives of the proposed project is considered economically infeasible. Capital costs for such a facility would be difficult to recover due to the need to develop new infrastructure, support facilities and purchase new equipment. The proposed action is intended to be a demonstration project which is based on a proposal by FERCO in association with the McNeil Station joint-owners. The McNeil Station site offers several advantages to the proposed demonstration project. For example, the existing wood supply and infrastructure already provides a stable wood fuel to the gasification process. In addition, the familiarity of the McNeil Station operators with wood handling and combustion processes provides the required background for operation with a wood gasifier. Moreover, based on the construction of a biomass gasifier, associated support facilities, and other required

infrastructure to support a totally independent gasifier environmental impacts would be expected to be greater than those from the proposed project. As such, this alternative has dismissed from further analysis.

The alternative of locating the proposed project at an existing facility other than the McNeil Station was also considered. The effects of siting a biomass gasifier and modifying an existing wood burning power plant to satisfy the objectives of the proposed project would be considered similar to the proposed project. Since the proposed project would not pose any adverse effects, the alternative of siting the proposed project at another existing facility offers no distinct advantages over the McNeil Station site. As such, this alternative was dismissed from further analysis.

CHAPTER 3
AFFECTED ENVIRONMENT

The following chapter describes the affected physical and social environment of the project area.

3.1 AIR QUALITY

This section summarizes the existing air quality setting for the proposed project area. The existing climate and meteorology of the proposed project area is summarized in the Appendices A and D.

3.1.1 AMBIENT AIR QUALITY STANDARDS

Ambient air quality is primarily a result of the type and amount of pollutants emitted into the atmosphere, the meteorological conditions which disperse these emissions, and the size and topography of the region. Ambient air quality standards (AAQS) have been developed by the federal government to establish levels of air quality which, when exceeded, may cause adverse human health effects. Air quality is generally considered acceptable if pollutant levels are less than or equal to the AAQS on a continuous basis. The State of Vermont does not have state specific AAQS; they refer to the federal AAQS.

The proposed project is within the jurisdiction of the Vermont Agency of Natural Resources, Environmental Conservation Department, Air Pollution Control Division (APCD). Both the U.S. Environmental Protection Agency (EPA) and the APCD have established, and are responsible for, attaining and maintaining the AAQS. The status of attainment of AAQS for all pollutants is tracked to ensure that health standards are being met. The area around Burlington is in attainment status for the federal AAQS for all criteria pollutants such as carbon monoxide, nitrogen oxide, particulate matter, sulfer dioxide, and hydrocarbons (refer to Appendix D-1).

3.1.2 AIR QUALITY REGULATIONS

3.1.2.1 Federal Regulations - The EPA promulgated federal AAQS, as defined in Section 3.1.2.2, under the provisions of the Federal Clean Air Act (CAA). In addition, the CAA with the 1990 amendments is divided

into 11 Titles, the first five are potentially most relevant to the proposed project. Title I deals with the attainment and maintenance of the AAQS. It defines various levels of attainment for each type of criteria pollutant and requires levels of control technology depending on the severity of nonattainment. Implementation of Title I is delegated to the State of Vermont. Written operating permits and Best Achievable Control Technology (BACT) requirements are examples of the implementation of Title I.

Title II refers to mobile sources. The authority to implement Title II is given to the Vermont Agency of Natural Resources. The same is true of Title III which deals with hazardous air pollutants. Title III lists 189 hazardous air pollutants which are incorporated into the Vermont list of Hazardous Air Contaminants. Maximum Achievable Control Technology (MACT) is required for identified categories and subcategories of sources. The CAA requires the EPA to promulgate regulations establishing MACT emission standards for each category and subcategory of major sources of listed hazardous air pollutants. Implementation schedule for establishing the MACT standards required 25 percent of the categories to be issued by November 15, 1994, and requires an additional 25 percent by November 15, 1997, and all categories by November 15, 2000. Permitting, risk assessment, and accidental release prevention are also addressed in Title III and implemented by the state agency. Title IV deals with acid rain and control of major sources of sulfur dioxide and nitrogen oxides.

Title V of the CAA involves establishing Federal Operating Permits which encompass and supplement state air permitting programs. The main components of the Federal Operating Permit program are for affected Major Sources. Major Sources for an entire facility are permitted for a maximum 5 years and are subject to public, neighboring states, and EPA review. Any significant modifications to the facility triggers the modification of the permit and additional review.

In general, federal actions must conform to the requirements of State Implementation Plans promulgated pursuant to the CAA. Document 40 U.S.C. 7401 et. seq. specifies procedures applicable to the determination of conformity.

3.1.2.2 State Regulations - The State of Vermont has a separate set of air quality regulations administered by the APCD, which apply to projects within the state. The APCD is primarily responsible for regulating all stationary and nonvehicular sources.

Subchapter V, Section 5-501, "Review of Construction or Modification of Air Contaminant Sources," requires that a new or modified source obtain written authorization from the Secretary of the Agency of Natural Resources. This regulation includes permitting and emission control requirements for both new or modified major sources and non-major sources of air contaminants.
Requirements include:

- Submission of plans
- Specifications
- Analyses
- Visibility impact analyses
- Public notification procedures.

3.1.3 SIGNIFICANCE CRITERIA

Subchapter I, Section (48) of the APCD regulations defines a Major Stationary Source of air emission as any stationary source or modification whose allowable emissions of any air contaminant are equal to or greater than 50 tons per year. Subchapter I, Section (77) of the APCD regulations defines a significant source as a new or modified source with emissions increases that equals or exceeds a maximum threshold for any criteria pollutant. The limits established by this section for each category of pollutant are:

Pollutant	Tons per Year
Particulate Matter (PM_{10})	15
Carbon Monoxide (CO)	50
Nitrogen Oxides (NO_X)	40
Volatile Organic Compound (VOC)	40
Sulfer Dioxide (SO_2)	

These limits or thresholds will serve as the primary criteria for determining the significance of the air emissions for the proposed project.

3.2 WATER RESOURCES AND WATER QUALITY

3.2.1 WATER SUPPLY

The McNeil Station receives process waters (boiler feedwater and cooling tower make-up) from four supply wells located approximately 1,200 meters (4,000 feet) north of the plant. Each well is 17 meters (56 feet) deep and has a rated capacity of 2,080 liters per minute (550 gallons per minute). Normally only one well is required to supply water for full load operation. The water is pumped to the station through an 8-inch underground fiberglass pipe. Due to inherently high and fluctuating dissolved iron concentrations in the groundwater, the plant routinely treats the incoming water to reduce the amount of iron. Waters used for boiler feedwater receive additional treatment through demineralizer units. Water for on-site potable and sanitary uses is drawn from the municipal water supply and can also be used for the emergency process water supply.

3.2.2 WASTE WATER

Waste waters from the McNeil Station (boiler blowdown, cooling tower blowdown, neutralized demineralizer regenerant, treated floor drainage, and water treatment filter backwash) are treated and routinely discharged to the Winooski River, located approximately 300 meters (1,000 feet) east of the plant (Figure 2-2). Except for the cooling tower blowdown, all utility waste water is first sent to the on-site waste water lagoons. Following retention in the lagoons the effluent is mixed with cooling tower blowdown and discharged to the Winooski River. The Vermont Department of Environmental Conservation (VDEC) has classified the Winooski River as a Class B receiving water (10 USA, Part 1252). Class B waters are suitable for bathing, recreation, irrigation, and agricultural uses; provide good fish habitat; have good aesthetic value; and are acceptable for public water supply with filtration and disinfection.

The McNeil Station currently discharges its liquid effluents in accordance with its National Pollutant Discharge Elimination System (NPDES) permit. The permit is administered by the Secretary, Agency of Natural Resources, while compliance oversight is managed by the Waste Water Management Division of the VDEC. Generally, the NPDES permit establishes limits on temperature, types and amounts of effluents discharged, and total gallons released to preserve the integrity of the receiving water. The Station continually monitors discharged effluents for flow, pH, chlorine, and temperature. Once a month, samples are taken and analyzed for iron, phosphorous, total dissolved solids, total suspended solids, oil and grease, and turbidity. Inquiries to the VDEC indicate that the McNeil Station has been consistently compliant with its NPDES permit (Sternbach, 1995).

All potable water drains and sewerage are serviced by a lift station to the municipal treatment plant.

3.2.3 STORMWATER RUNOFF

The current McNeil Station NPDES permit prohibits any discharge of wood chip leachate to surface waters or groundwaters. However, the permit states that leachate is not to be construed as including stormwater or snowmelt runoff from the surface of the piles. Standard operating procedures limit the amount of wood chips stored on site at any given time to 40,000 tons. The piles are stored on top of sand filtration beds which allow percolation of runoff water. This combined with effective woodchip management (first in, first out) precludes the accumulation of runoff and leachate, respectively.

3.3 NATURAL RESOURCES

The following sections describe the current supply/demand and condition of wood resources in the project area. Further information and data are included in Appendix D.

3.3.1 EXISTING WOODCHIP SUPPLY AND DEMAND

Based on data published by the U.S. Forest Service (USFS), 50 percent of Vermont's forest inventory is wood that has no potential for manufacturing quality products such as wooden ware or furniture. The

amount of wood available for whole tree chip harvesting has been conservatively estimated at one million wet (commonly referred to as green tons) tons per year in Northern Vermont alone. There is approximately 1 dry ton for every 2 wet tons of wood.

Silvicultural and wood harvesting concerns were extensively addressed during the hearings to obtain the Certificate of Public Good. (The requirements of the Certificate of Public Good, BED's "Harvesting Policy for Whole Tree Chipping Operations in Vermont", regulations for chip harvest operation, "Policy for Employees Monitoring Chip Harvester Operations", a "Report of Chip Harvester Operations in Vermont", and a "Chip Harvester Monitoring Inspection Summary - 1986" are included with this EA as Appendix A).

According to the Vermont Department of Forests, Parks, and Recreation (VDFPR), "In producing electricity through the use of wood-fired plants, the challenge is to ensure that harvesting of wood fuel is carried out in a manner which has a positive impact on the forest - encouraging wood harvesters to not only avoid making the forests less healthy, but to conduct their operations in such fashion that the vitality for our forests is actually improved." Originally, VDFPR monitored 100 percent of BED's harvesting activities. This was later reduced to 30 percent, and is now done only on occasion. So satisfied was the VDFPR with its findings, it concluded "...the dual goals of producing electric energy through the use of wood and maintaining Vermont's forests in a healthy state are being achieved" (VDFPR, 1987).

The McNeil Station is designed and permitted to handle 500,000 green tons of wood chips per year, half of what has been conservatively estimated by the USFS to be available to wood chip consumers. However, on average the McNeil Station has been using approximately 160,000 green tons a year, based on operational data collected over the last 10 years (BED, 1995). The amount of wood used is dependent upon the operating conditions of the station. To run the station at full-load, the consumption of wholetree chips is approximately 76 tons per hour.

Harvested by various commercial contractors approved by BED, wo odchips may be obtained from any forestland where low-quality trees are found. The majority of these woodlands are privately owned. Approximately 80 percent of the woodchips that fuel the McNeil Station

are called whole tree chips and come from low-quality trees and harvest residues which are cut and chipped in the forest. The chips are then transported by trailer truck to the Station or to a railcar loading site in Swanton, Vermont (approximately 40 miles north of Burlington). The remaining 20 percent of McNeil's wood requirements are met by purchasing residues such as chips and bark from local sawmills (BED [no date]).

3.4 NOISE

Noise is technically defined as sound waves perceptible to the human ear. Sound waves are characterized by sound pressure expressed as decibels (dB). For regulatory purposes, community noise levels are usually measured in terms of the A-weighted decibel, abbreviated dBA.

One noise description method typically used in describing noise generation and the method used to measure noise at the McNeil Station is the Day-Night Average Level (L_{dn}). This value is obtained by averaging logarithmically the varying sound levels during a 24-hour period. In this measurement noise that occurs during certain sensitive time periods is weighted more heavily in the calculation. Therefore, a 10 dB penalty is added to the night-time sound levels (10 p.m. to 7 a.m.).

The City of Burlington has published noise ordinances and although they do not specify decibel limits, they do prohibit sound-producing devices that tend to disturb the peace and quiet of a neighborhood. In 1985, a noise study was performed for McNeil Station operations (Hundal, 1985) including noise from wood chip unloading, cooling tower operations, and the ash conveyor. Results from this study showed that noise levels at the nearest receptor point on Manhattan Drive (approximately 1500 feet) averaged 61.4 dBA. This noise level corresponds to plant operation over a 24-hour period with no railcar unloading. Since this study there have been no equipment additions or increases in wood deliveries that would cause plant noise to exceed the 61.4 dBA value.

3.5 SOCIOECONOMICS

The following section has been summarized from information/data included in Appendix D - Environmental Technical Reports.

In response to Executive Order (E.O.) 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", E.O. 12898 requires Federal agencies to identify and address environmental effects of their projects on minority and low-income populations. The approach taken in this EA is intended to identify potential effects from project-related activities on areas of minority or low-income populations.

Socioeconomic issues which are relevant to the proposed action are effects to the existing social and economic conditions in Chittenden County and the City of Burlington. The following subjects are addressed: economy, population, and housing. This section also includes information on the local fire protection services.

3.5.1 ECONOMY

Chittenden County is part of a four-county area that comprises the Northwest region of Vermont, and contains the only metropolitan area in the state, half of Vermont's 24 largest cities and towns, and more than one third of the state's residents (Vermont Dept. of Employment and Training, 1994).

The annual per capita income for Chittenden County in 1991 was $20,661, which is approximately 15 percent higher than the Vermont state average, while the county's annual wage in 1992 was $25,917, approximately 16 percent higher than that for the state. According to the 1990 Census, the City of Burlington's median household income is $25,523, as compared to $36,877 in Chittenden County and $29,792 statewide. (Mt. Auburn Associates, 1994).

Nearly 20 percent of the Burlington city residents live in poverty, a percentage that is more than double that of Chittenden County and significantly higher than the state. The problem is even more severe in specific parts of the city. In the Old North End of Burlington, in the vicinity of the proposed project, almost a third of residents live in poverty. Approximately 42 percent of children in this neighborhood fall below the poverty line. This neighborhood has the highest concentrations of poverty in the entire state (Mt. Auburn Associates, 1994).

To characterize the economic profile of the population nearest the McNeil Station, Census Tract 3, Block Group 1 was referenced. Mean earnings per household were approximately $24,673 per year, placing 28 percent of all households in the tract below the poverty level. According to the Community and Economic Development Office (CEDO), this is the largest concentration of low income residents in the state, and among the three or four locations in Vermont with poverty levels approaching 30 percent (Dillon, 1995).

3.5.2 POPULATION

In 1990, Burlington's population was almost 97 percent white, which is comparable to the state overall. However, during the 1980s, Burlington did experience, on a small scale, an influx of minorities. While the actual number of minority people settling in Burlington is relatively small, the total increase in population during the 1980s was slightly over 1,400, meaning that 60 percent of new Burlington inhabitants were minorities (Mt. Auburn Associates, 1994a and 1994b).

For this analysis, the City of Burlington CEDO was consulted. To characterize the population nearest the McNeil Station, Census Tract 3, Block Group 1 was referenced. In 1989, there were approximately 3,390 persons in Census Tract 3. These persons described themselves as follows: 3,232 White; 54 Black; 54 Asian; 23 Hispanic; 19 American Indian; and 8 identified as "Other". Thus, while minorities are represented in the area, with Asians as the fastest growing group, the area would not be designated as a "minority community."

3.5.3 FIRE PROTECTION SERVICES

Due to wood chip storage practices, the McNeil Station had a problem with both odors from decomposing chips, and recurring wood chip fires in its early operation (about 1985). However, the McNeil Station staff developed a wood storage plan for the facility in association with the fire marshall's office, quickly resolving the problems. The McNeil Station staff maintain a working relationship with the fire marshall's office, providing tours of the facility for fire response personnel (Marcus, 1995).

According to the fire marshall's office, the existing McNeil Station does not create a higher-than-normal burden for the local emergency services providers (Marcus, 1995). According to McNeil Station personnel, fire protection capability is also supplemented with onsite fire fighting equipment.

3.6 TRANSPORTATION

The following section has been summarized from information/data included in Appendix D - Environmental Technical Reports.

The McNeil Station routinely receives wood chip deliveries by rail and truck. As specified in the original Certificate of Public Good, 75 percent of the wood chip deliveries are transported by rail, the remaining 25 percent is delivered by truck. This limitation was placed in an effort to reduce the amount of traffic congestion in the City of Winooski's streets and historic districts. Shipments by truck and rail are also limited in the time they may deliver fuel. The Certificate of Public Good prohibits trucks from utilizing streets or highways within the Cities of Burlington or Winooski on Sundays or before 6:30 a.m or after 9:30 p.m. on any other day.

Before the McNeil Station was built and because of concern regarding increased traffic from fuel trucks in Winooski, the proponents of the McNeil Station sponsored a traffic study to forecast and evaluate impacts to local routes. The study used conservative estimates so that the net result of the assumptions exaggerated the consequences of the activity. It assumed the Station would be operating at full capacity (500,000 tons per year) and all fuel shipments would be made by truck. Based on these assumptions not more than 20 trucks would be arriving or departing the McNeil Station each delivery day. Furthermore, truck traffic to the McNeil Station would not constitute more than 1 percent of the increase in traffic expected from all sources by the year 2000, and that this increase would not cause a significant level of congestion at any major intersection (Certificate of Public Good Petition).

Truck deliveries generally travel Interstate 89 to Exit 15 or 16 and use East Allen Street or Main Street, respectively, to Riverside Avenue. The trucks then travel east on Riverside Avenue to Intervale Road where the McNeil Station is located. Traffic flows on these roads are

periodically monitored to determine the roads' Level of Service (LOS). The LOS is a qualitative measure that refers to the different operating conditions that occur in a lane or roadway when accommodating various traffic volumes. It includes traffic flow factors such as special travel time, interruptions, freedom to maneuver, driver comfort, and convenience. LOS is described by a letter rating system from A to F, with LOS A indicating stable flow and little or no delays, and LOS F indicating jammed conditions and excessive delays. East Allen Street and Main Street in Winooski generally have a B LOS during non-peak hours and may reach an E LOS during peak evening hours (Trzepacz, 1995). Riverside Avenue generally has a B LOS (Goodkind, 1995). It should be noted that Riverside Avenue is expected to be repaired and reconstructed in 1999 which should provide some capacity enhancement.

Based on operational data collected over the last 10 years, the McNeil Station's wood chip consumption is averaging approximately 160,000 green tons per year (Carr, 1995). Assuming a delivery ratio of 75:25 for rail and truck, respectively, approximately six trucks per day are used to transport wood chips to the McNeil Station. According to local authorities in both Burlington and Winooski, the small number of trucks delivering wood chips to the McNeil Station are virtually indiscernible. Data for daily rail shipments was not available, however approximately 95 rail shipments are made annually depending upon energy demand.

3.7 EFFECTS DISMISSED FROM FURTHER EVALUATION

The scope of this EA was determined following review of input provided by BED, Battelle, DOE, and FERCO during the preliminary scoping process. During that review, impacts associated with several issues were determined to have no effect to the environment. This section will review those issues and justify their no-net-effect conclusion. BED has elicited comments from applicable state agencies in support of their application for Public Good Certificate. Letters received from state resource agencies on potential impacts from Phase II of the proposed project have been placed in Appendix B. It should be noted that these letters are only in response to Phase II with the understanding that similar requests would be made for Phase III.

Cultural Resources: The proposed project components would be constructed on areas that have previously been disturbed by the existing McNeil Station, which was constructed on filled material. No historically significant structure exists within the McNeil Station boundaries. Impacts to cultural resources are not expected as a result of the proposed project.

Biological Resources: The proposed project components would be constructed on areas that have previously been disturbed from the existing McNeil Station, which was constructed on filled material. Since the proposed project has already been developed into an industrial land use and the site is devoid of any rare or endangered plant or animal species or sensitive biological habitat (i.e., wetlands), impacts to biological resources as a result of the proposed project are not expected.

Land Use: Since the proposed project does not plan to introduce any new land uses or new operation activities to the site, inconsistency relative to land use designations are not expected. The proposed project would not alter present or planned land uses of the area. The Chittenden County Regional Planning Commission and the Burlington Planning Commission have been apprised of the proposed project and have offered a waiver for Phase I of the proposed project. Land use impacts are not expected as part of the proposed project.

Risk of Upset: Since the proposed project would operate in a manner similar to existing operations, an increase risk of explosion or release of hazardous substances is not expected.

Geologic Resources: The proposed project would not effect any geologic resources (surface or substructure) either during construction or operation activities. The project proposes to install additional electric producing equipment on top of existing building pads. The site has previously been subjected to fill activities precluding any impacts to geologic resources.

CHAPTER 4
ENVIRONMENTAL IMPACTS

The following chapter summarizes the potential environmental impacts from the Proposed Action and No Action alternatives.

4.1 IMPACTS OF THE PROPOSED ACTION

4.1.1 AIR QUALITY

With implementation of Phase II, the current boiler at the project site would require a permit application and agency approval for modifying the allowable fuels to include the wood derived product gas. This permit application has been prepared by BED and relevant data from the application is included in Appendix C. The application indicates that Phase II of this proposed project would not increase the overall emissions of the facility.

With implementation of Phase III, the major emission source would be a gas combustion turbine. Phase III was assessed for potential adverse air quality impacts since it would be a new source of air emissions. To assess the potential impact, the emissions of criteria and toxic air contaminants for Phase III were estimated and compared to the Significant Source Thresholds discussed in Section 3.1.4. The impact assessment of Phase III of the proposed project on local and regional air quality was based on:

- Analysis of criteria and air toxic emissions expected to be released from the project

- Screening level computer modeling analysis of six air toxic emissions.

The emissions and screening air dispersion modeling analyses presented in the following sections describe the emission sources, quantities, and release concentrations of various criteria and air toxic pollutants. Appendix C presents the emission estimates in detail along with the calculation methodology.

Phase II - Wood Gasification and Product Gas Combustion: The estimated emissions associated with the wood gasification and boiler combustion was calculated by Tech Environmental for the Vermont APCD-Order Approving Construction Permit application. A copy of the calculations summary of NO_X, CO, ROG, SO_2, and PM_{10} emissions submitted with the application are included in Appendix C.

According to the permit application provided in Appendix C, Phase II operations would not increase the emissions from existing operations and therefore, the current permit limits on the existing boiler would not be exceeded. The permit modification would allow the McNeil Station to burn product gas in order to test its combustibility. During the test period, the product gas would replace or supplement the existing wood and/or natural gas combustion. The total heat input would remain constant, and therefore no additional air emission impacts are expected during Phase II operation.

Phase III - Electric Generation with Gas Combustion Turbine: If the Phase II operation is successful, Phase III operations could begin. The product gas produced would be used as fuel in a gas combustion turbine generator to produce up to an additional 15 MW of electricity.

The total emissions estimated for Phase III of the proposed project during typical operations are summarized in Table 4-1.

Table 4-1
Total Emissions-Phase III Operations

	Emissions (tons/year)				
	NO_X	CO	ROG	SO_X	PM_{10}
Phase III Gas Combustion Turbine Source	36	48	1	0	13
APCD - Major Source Threshold	50	50	50	50	50
APCD - Significant Source Threshold	40	50	40	40	15

Source: Dames & Moore, 1995

As shown in the above table, the expected emissions from the gas combustion turbine are below the Vermont APCD standards for a major or significant source. Therefore, no adverse air quality impacts are expected from the operation of Phase III.

Air Toxic Emissions: Potential air toxic emission impacts were evaluated for Phase III of the proposed project. Based on the assumptions made to estimate the air toxic emissions, six air toxic required additional analyses for impact evaluation. The USEPA SCREEN2 air dispersion model was used to estimate the annual average concentration in Fg/m^3. The air toxic emissions expected and the predicted annual concentrations for Phase III of the proposed project during typical operations are summarized in Appendix C and D-1. The results of the screening air dispersion modeling demonstrate that the average annual concentrations of the six air toxic which required additional analyses would not exceed the concentration based significance criteria. Therefore, no adverse air quality impacts are expected during Phase III operations. A printout of the air dispersion modeling output and related calculations is presented in Appendix C.

4.1.2 WATER RESOURCES AND WATER QUALITY

This section evaluates the impacts to the McNeil Station's existing water source and water treatment processes. Water use for both phases of the proposed action is not expected to affect the existing water supplies from the four on-site wells, and since most of the additional water needed will be part of water recirculation loops in the new process equipment, no appreciable change in volume discharged or water chemistry is expected.

4.1.2.1 Water Supply - It is anticipated that operation of the gasifier during Phase II would require no more than 380 liters per minute (100 gallons per minute) of cooling water. An additional volume of water would be used in the scrubber to cleanse the product gas before use in the boiler and turbine. While the volume of water needed for scrubber operation is unknown at this time, the volume is not expected to exceed the capacity of the supply wells. During Phase III (gas turbine operation), only a small amount of water 190 liters per minute (50 gallons per minute) would be used to cool bearings in the equipment. The gas turbine design is such that special internal

lubricating oils cool the components to design specifications, therefore no externally supplied coolant is required for its operation.

As stated in Section 3.2, there are four supply wells for the McNeil Station, each with a 2,080 liters per minute (550 gallons per minute) capacity. Since supply water from one well is sufficient for current operations, the combined capacity of the four wells would be adequate to supply cooling water to both the existing facility and proposed gasifier. The additional 570 liters per minute (150 gallons per minute) for the gasifier and turbine (conservative estimate) would constitute only 7 percent of water currently available from the supply wells. Therefore, no additional wells would be needed and no adverse impacts to the water supply are expected.

4.1.2.2 Waste Water - Cooling water used in the gasifier and turbine operation would be routed to the existing site cooling tower (refer to Section 3.2.2) to be cooled and recirculated back through the process equipment. This small volume of water would not exceed the tower's capacity and is expected to have the same chemical additives as currently used cooling water.

In previous small-scale gasifier testing programs scrubber waste water was treated using a settling chamber, a sand filter, and a charcoal filter (PNL, 1989). This simple treatment system was adequate to provide a discharge water that was within EPA drinking water standards. While the exact scrubber water treatment has not been designed for this demonstration project, similar methods can be expected to ensure that all waste water meets or exceeds drinking water standards. Based on cooling water estimates and information from previous gasifier testing programs, the proposed action is not expected to appreciably change the volume of liquid effluent or introduce harmful pollutants to the Winooski River.

4.1.2.3 Stormwater Runoff - As mentioned in Section 3.2.3, the McNeil Station limits the amount of woodchips stored on site to 40,000 tons. Although Phase III may require up to 80,000 tons of additional

wood chips, the chips would be brought in on an as needed basis. Therefore, no increase in storage or associated runoff would be attributed to the proposed project.

4.1.3 NATURAL RESOURCES

The wood fuel for the proposed project would be identical to that which is presently utilized at the McNeil Station. During Phase II of the proposed project, any amount of wood combusted in the gasifier will displace an equal amount of wood that otherwise would be combusted in the McNeil Station boiler. Since there would be no additional woodchip usage during Phase II, no adverse impacts are expected.

Estimates prepared for the proposed project indicate that if Phase III of the project (the gas turbine generator) is implemented, a maximum of an additional 80,000 tons of green wood chips per year would be required (BED, 1995). Resource demand analyses prepared for the existing McNeil Station were based on the use of 500,000 green tons of wood chips per year. However, the facility's use has averaged 160,000 green tons per year (BED, 1995). The additional 80,000 tons, when added to the 160,000 tons typically used, would be approximately 240,000 tons. This is still less than half the basis for the previous impact analysis, and well within range of use analyzed for the McNeil Station. The VDFPR was consulted to identify additional demands made on local woodchip resources since the original analysis. The VDFPR indicated that since the analysis for the McNeil Station was prepared, two additional woodchip-burning electric power plants have come on-line. However, according to VDFPR, even with the demands from the plants, and the maximum additional woodchip demand from Phase III of the proposed action, an adequate supply of woodchip resource would be available for existing and future demands. Therefore, an additional 80,000 ton woodchip demand during Phase III would not have an adverse effect on woodchip resources (VDFPR, 1995).

4.1.4 NOISE

This section evaluates the potential incremental noise impacts from the proposed project. During Phase II, the major noise sources during operations would be the gasification unit and associated support equipment (i.e., conveyor) to transfer wood chips. Since these sources

are essentially the same as the existing equipment (refer to Section 3.4) and noises associated with Phase II would not be considered a significant noise-generator, noise from Phase II would be virtually indistinguishable from existing background noise. Moreover, all equipment associated with Phase II would be housed in an enclosure which would further reduce noise with operations. No adverse noise impacts are expected.

For Phase III, the main sources of noise would be the combustion turbine inlet air, pumps, valves, fans and blowers, and generators. All equipment associated with Phase III would be housed in a sound-dampened enclosure to reduce noise levels. Based on an industry standard combustion turbine and associated equipment, resulting noise levels are expected to range from approximately 56 to 70 dBA, with an average of 59 dBA at 305 meters (1,000 feet). Based on expected ambient noise levels, attenuation reductions due to distance and installing potential noise-generating equipment in noise reducing enclosures, significant increases in noise levels at noise-sensitive receptors are not expected.

4.1.5 SOCIOECONOMICS

This section describes potential impacts to the socioeconomic setting and local fire protection services. The effects of the proposed project relative to E.O. 12898 is also discussed in the following section.

It is anticipated that an average of 16 workers would be employed during construction of Phase II. Based on preference of construction contracts being given to locally based companies, the project is not expected to generate a major influx of new employees. Since the construction labor force would not represent a large increase in the permanent or visitor population to the Burlington area, adverse impacts to the socioeconomic setting is not expected.

The test program for the gasifier is anticipated to last for approximately 8 to 10 months. While no increase in the facility's operational workforce is anticipated, there will be a large number of consultants, visitors, and technicians visiting the plant in this time frame. Local hotels, restaurants, and car rental agencies could realize increased business activity as a result. While the proposed project may

be a beneficial economic impact, it would not result in changes or additions to local employment or housing inventories and, therefore, would not be a significant economic growth factor. No adverse financial impact on the local economy is anticipated in funding the project.

The fire marshall has indicated that the proposed project (Phase II or III) would not create any additional demand to the existing fire protection service. Based on the local fire fighting resources ability to serve the proposed project. Adverse impacts to fire protection services are not anticipated.

As discussed throughout Chapter 4, no adverse environmental or social impacts would be expected with implementation of Phase II or Phase III of the proposed project. Moreover, as discussed in Section 3.5.1, the nearest population to the proposed project is not predominantly composed of minority or low-income groups. Consequently, the proposed project would not be expected to result in unfair or unequal treatment of any low-income or impoverished communities or populations. The new job opportunities associated with the proposed project could provide low-income groups with employment depending on availability of appropriate labor skills.

4.1.6 TRANSPORTATION

For the purposes of this EA, changes in traffic volume were evaluated for both Phase II and Phase III. Phase II would involve constructing and operating the gasifier, and using the product gas to power the existing McNeil Station boiler. Since there would be no net change in fuel consumption, no additional fuel would be transported by truck or rail. However, during gasifier construction an estimated 20 trucks would be required to transport construction material to the site. This is expected to occur over a 2-month period (Narrative for Act 248 Use). Based on the small amount of vehicle trips and the duration of construction, impacts to existing roadway capacity would not be expected.

In Phase III, up to 80,000 tons of wood fuel could be required in addition to fuel used for the boiler because the gasifier, turbine, and

boiler would be operating simultaneously. Based on fuel projections, traffic to the McNeil Station would increase by approximately 3 trucks per day and 40 trains per year (approximately 1 every 9 days).

The original Certificate of Public Good expressed a concern only for truck traffic and concluded that 20 trucks per day would not result in any adverse impacts to traffic conditions in Winooski. Since the McNeil Station has been on line it has been operating at roughly 37 percent of capacity, with a corresponding traffic burden of only a fraction of what was allowed. From Phase III, the 3 additional trucks per day would bring the total fuel truck traffic to 9 vehicles per day. This number is less than half of what was originally allowed. Based on the allowances in the Certificate of Public Good, Phase III of the demonstration project is well within the predicted and accepted limit for truck transport and, therefore, would not have an adverse impact on traffic conditions in and around the Cities of Burlington and Winooski.

4.2 IMPACTS TO THE NO ACTION ALTERNATIVE

With implementation of the No Action Alternative, all potential impacts associated with the proposed project would be avoided. However, under the No Action Alternative, the objective and opportunity to demonstrate a superior gasification technology would not be explored and the commercial viability would not be demonstrated.